Comparative study of the physical and tensile properties of Jicama (Pachyrhizus erosus) starch film prepared using three different methods

ABSTRACT

The objective of this work is to study the physical and tensile properties of jicama (Pachyrhizus erosus) starch film prepared using three different methods. First, a film is prepared from starch granules after sifting using a sieve shaker. A second film is prepared from starch granules after ultra-sonication. Another film is made by sonicating the starch gel. Ultrasonication is performed using an ultrasonic probe. These three different methods have a significant effect on the properties of the film ($p < 0.05$). The film from the starch granules after sifting using 63μm mesh size and ultrasonication (labeled as S-63U film) shows the optimum properties. Opacity for S-63U film is almost half (48.6%) that of the equivalent non-sonicated film. S-63U film has the highest tensile strength (3.1 MPa), the lowest moisture absorption (18% after 8 h in a humid chamber) and water vapor permeability. FESEM morphology of the fracture surface of the sonicated film display a more homogeneous structure compared to films without ultrasonication.

Keyword: ANOVA; Bioplastics; Starch; Ultrasonication